# FIFTH FIVE-YEAR REVIEW REPORT FOR JOHNSTOWN CITY LANDFILL SUPERFUND SITE FULTON COUNTY, TOWN OF JOHNSTOWN, NEW YORK

**Prepared by**

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## LIST OF ABBREVIATIONS & ACRONYMS

| | |
|---|---|
| CFR | Code of Federal Regulations |
| EPA | United States Environmental Protection Agency |
| FYR | Five-Year Review |
| HA | Health Advisory |
| ICs | Institutional Controls |
| MCLs | Maximum Contaminant Levels |
| µg/L | Micrograms per liter |
| mg/L | Milligrams per liter |
| mg/kg | Milligrams per kilogram |
| NPL | National Priorities List |
| NYCRR | New York Codes, Rules and Regulations |
| NYSDEC | New York State Department of Environmental Conservation |
| O&M | Operation and maintenance |
| OU | Operable Unit |
| PFOA | Perfluorooctanoic acid |
| PFOS | Perfluorooctanesulfonic acid |
| QAPP | Quality Assurance Project Plan |
| RAO | Remedial Action Objective |
| RI/FS | Remedial Investigation/ Feasibility Study |
| ROD | Record of Decision |
| SGV | Sediment Guidance Value |
| SMP | Site Management Plan |
| SVOCs | Semivolatile organic compounds |
| UU/UE | Unlimited Use/Unrestricted Exposure |
| VI | Vapor Intrusion |
| VOC | Volatile Organic Compound |

## I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR for the Johnstown City Landfill site pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the site. The triggering action for this statutory review is the completion date of the previous FYR, which was September 9, 2016. The FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The site is being addressed as a single operable unit (OU), which is the subject of this FYR.

This FYR was conducted by EPA remedial project manager George Jacob. Participants included Charles Nace, EPA ecological risk assessor; Urszula Kinahan, EPA risk assessor; Paul Zarella, EPA hydrogeologist; Larisa Romanowski, EPA community involvement coordinator; and Nicole Hinze of the New York State Department of Environmental Conservation (NYSDEC).

### Site Background

The Johnstown City Landfill is a former municipally-operated, unlined landfill situated in the Town of Johnstown, Fulton County, New York. The site is located approximately 1.5 miles northwest of the City of Johnstown and 1.75 miles west of the City of Gloversville (see Appendix A, Figure 1).

The site is generally bordered by low density residential areas along West Fulton Street Extension to the north and mixed wooded and agricultural lands to the east, south, and west. Approximately 10 homes are located within 1,000 feet of the site and approximately 95 homes are located within one mile downgradient of the property. All of these homes had private wells before the public water supply was extended to them as part of the selected remedy.

The landfill was used as an open refuse disposal facility from 1947 to 1960 before being converted to a sanitary landfill. The landfill accepted industrial wastes from local tanneries and textile plants until 1979 and sludge from the Gloversville-Johnstown Joint Sewage Treatment Plant from 1973 to 1979. Landfill operations ceased in 1989. Much of the tannery wastes were disposed of as chromium-treated hide trimmings and other materials. Sewage sludge was disposed of in open piles at a rate of approximately 20,000 cubic yards per year. The sludge contained concentrations of chromium, iron, and lead. There are no records available which detail the amount of industrial wastes accepted by the landfill.

Appendix B, attached, summarizes the documents utilized to prepare this FYR. Appendix C, attached, summarizes the site's topography and geology/hydrogeology. For more details related to the site, please refer to https://www.epa.gov/superfund/johnstown-city-landfill.

## FIVE-YEAR REVIEW SUMMARY FORM

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site Name:** Johnstown City Landfill Superfund Site | | |
| **EPA ID:** NYD980506927 | | |
| **Region:** 2 | **State:** NY | **City/County:** Town of Johnstown/Fulton County |

| SITE STATUS | |
|---|---|
| **NPL Status:** Final | |
| **Multiple OUs?**<br>No | **Has the site achieved construction completion?**<br>Yes |

| REVIEW STATUS |
|---|
| **Lead agency:** State<br>***[If "Other Federal Agency", enter Agency name]*:** |
| **Author name (Federal or State Project Manager):** George Jacob |
| **Author affiliation:** EPA |
| **Review period:** 09/17/2016 - 01/20/2021 |
| **Date of site inspection:** 9/17/2020 |
| **Type of review:** Statutory |
| **Review number:** 5 |
| **Triggering action date:** 9/6/2016 |
| **Due date *(five years after triggering action date)*:** 9/6/2021 |

## II. RESPONSE ACTION SUMMARY

### Basis for Taking Action

On June 10, 1986, the Johnstown City Landfill site was placed on the Superfund National Priorities List.

On June 5, 1987, the State of New York filed suit against the City of Johnstown, the Gloversville/Johnstown Joint Sewer Board, Bruce Miller Trucking Company, and about a dozen

waste generators. Several of the defendants subsequently impleaded approximately 52 third-party defendants, including additional generators, transporters, and a number of area municipalities. When the defendants declined to fund a remedial investigation and feasibility study (RI/FS), the State and the City of Johnstown entered into an interim consent order, which was approved by the Federal Court on October 4, 1988. Under the terms of the interim order, the City agreed to conduct an RI/FS.

Based upon the results of the RI, which was carried out from 1989 to 1992, it was determined that site soils were contaminated with volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, and pesticides. VOCs, SVOCs, and metals were detected in downgradient monitoring wells. VOCs, SVOCS, and inorganic compounds were found in surface water samples collected from nearby Mathew Creek. Sediment contamination in Mathew Creek included metals, SVOCs, and pesticides.

As part of the RI, a human health risk assessment was conducted. Under the current land-use conditions, the cumulative cancer risk for all receptors evaluated (*i.e.,* adults, youths, and children) was $6 \times 10^{-5}$, which was within EPA's acceptable cancer risk range of $10^{-4}$ to $10^{-6}$. However, under future land-use conditions, which assumed that the contaminated groundwater beneath the landfill migrated to a residential receptor, a cancer risk of $2 \times 10^{-4}$ was found for the adult receptor. This risk, which slightly exceeds the acceptable cancer range, is attributable to the ingestion of groundwater, with beryllium accounting for most of the risk. An ecological risk assessment was conducted and concluded that contaminants in Mathew Creek adversely impacted aquatic communities.

## Response Actions

On March 31, 1993, EPA issued a Record of Decision (ROD) selecting a remedy for the site. The remedial action objectives (RAOs) identified in the ROD were as follows:

- Prevent human and animal contact with contaminated soil from the landfill surface;
- Preventing erosion of contaminated surface soil through surface-water runoff;
- Minimize the infiltration of rainfall or snow melt into the landfill, thus, reducing the quantity of water percolating through the landfill materials and leaching out contaminants;
- Mitigate the off-site migration of contaminated groundwater; preventing unacceptable exposure to off-site contaminated ground water;
- Restore groundwater quality to levels which do not exceed state or federal drinking-water standards;
- Prevent ingestion of on-site groundwater; control generation and prevent migration of subsurface landfill gas; and
- Prevent unacceptable exposure to vapors from the landfill.

The selected remedy included:

- Excavation of the LaGrange Gravel Pit sediments and placing the excavated materials on the existing landfill (the pit will be filled with clean fill so that it may be used as an infiltration basin and/or stormwater collection basin);
- Regrading and compacting the landfill mound to provide a stable foundation for placement of the various layers of the cap and to promote rapid runoff;
- Construction of a multilayer closure cap (impermeable membrane, 12 inches of sand, and 12 inches of topsoil) over the landfill mound and excavated sediments as per New York State 6 NYCRR Part 360 regulations. The cap, by reducing leachate generation, will act to improve the groundwater quality in the upper (overburden), lower (bedrock) aquifers, and surface-water quality in Mathew Creek through natural attenuation of contaminants;
- Expansion of the Johnstown City water-supply system to provide potable water to all private water supplies potentially impacted by the landfill. Providing city water will require the extension of the City's water lines and construction of a booster pump station;
- Imposition of property deed restrictions by the appropriate state or local authorities to prevent the installation of drinking water wells at the site, and restrict activities that could affect the integrity of the cap;
- Erection of approximately 6,800 feet of conventional chain-link fencing surrounding the entire landfill mound, with placement of appropriate warning signs; and
- Implementation of a public awareness program to ensure that the nearby residents are familiar with all aspects of the response action.

The ROD also indicated that the effectiveness of the landfill cap would be evaluated through post-construction monitoring of groundwater and surface water quality. The evaluation would be conducted within five years following initiation of construction of the landfill cap, and at any time as needed thereafter, during the long-term monitoring of the site. Should the monitoring results indicate that either groundwater quality in the upper (overburden) aquifer or the lower (bedrock) aquifer, or surface water quality in Mathew Creek, is not being restored to acceptable levels through natural attenuation because of reduced leachate generation, the following activities would be implemented:

- Extraction of contaminated groundwater from either of the aquifers, as necessary;
- Treatment of groundwater by a treatment system located permanently on-site that would use physical/chemical processes such as pH adjustment, chemical precipitation, and carbon adsorption, to remove inorganic and volatile organic contaminants; and
- Discharge of treated groundwater by returning it to the aquifer via percolation ponds or injection wells, or by discharging it to a stream, the nearest being Mathew Creek.

## Status of Implementation

### Landfill Closure

From 1995 to 1996, Delaney Construction installed perimeter site access controls, excavated LaGrange Gravel Pit sediments and consolidated them on the top of the landfill, and constructed a multilayer closure cap over the landfill mound and excavated sediments.

**Waterline Extension**

From 1996 to 1997, Syracuse Constructors extended the City of Johnstown's waterline to 96 homes and the nearby Pine Tree Rifle Club.

**Institutional Controls Summary Table**

Table 1, below, summarizes the status of the ICs.

**Table 1: Summary of Planned and/or Implemented Institutional Controls**

| Media, engineered controls, and areas that do not support UU/UE based on current conditions | ICs Needed | ICs Called for in the Decision Documents | Impacted Parcel(s) | IC Objective | Title of IC Instrument Implemented and Date (or planned) |
|---|---|---|---|---|---|
| Groundwater and Soil | Yes | Yes | Landfill properties | Restrict future development or use of the landfill property that could compromise the integrity of the remedy or cause the contaminants to migrate without the express written approval of NYSDEC and EPA and prohibits the installation of drinking water wells on the landfill mound and the use of the underlying groundwater for potable or process water. | Declaration of Restrictive Covenants, Restrictions and Environmental Easements (DCR&EE); January 8, 2016 |
| Groundwater | Yes | Yes | Adjacent County owned property | Restrict installation of groundwater wells and groundwater | DCR&EE; January 8, 2016 |

| | | | | | |
|---|---|---|---|---|---|
| Groundwater and wells | Yes | Yes | Adjacent privately owned property | Access to the monitoring wells and restrict future activities in the area where the monitoring wells are located; | Service, Notification and Access Agreement March 2016; and Environmental Notice by NYSDEC August 5, 2016. |

**Systems Operations/Operation & Maintenance**

An Operation and Maintenance (O&M) Manual, covering post-landfill cap construction inspection and maintenance procedures, was approved by NYSDEC as part of the remedial design. The O&M Manual contains the procedures for inspecting and evaluating the landfill cap, monitoring of groundwater quality in the immediate perimeter of the landfill, and long-term monitoring of downgradient groundwater. Repairs are to be made to the cap and drainage systems, as necessary, to control the effects of settling, subsidence, erosion, or other events that might interfere with the performance of the remedy.

The O&M Manual requires quarterly inspections of the following:

- The landfill cap for signs of erosion, excessive settlement, surface water ponding, seedling growth, and stressed vegetation;
- The site for any vectors and report damage;
- The groundwater monitoring wells for ease of locating, operation of locks, damage/vandalism, and the condition of the surface seals;
- The site access gates and fence for operational locks, vandalism, and damage;
- The access roads for ruts, puddles, and drivability; and
- The site for debris, litter, and/or waste.

Beginning in 1996, groundwater and surface water monitoring at the site was performed on a quarterly basis; groundwater and surface water samples were analyzed for baseline and routine parameters in accordance with 6 NYCRR Part 360-2.11(d)(6). In 1999, NYSDEC approved a revision of the environmental monitoring frequency from quarterly to semiannually.

A revised Quality Assurance Project Plan (QAPP) and Site Management Plan (SMP)[1] were submitted in 2015. The SMP was approved by NYSDEC in 2016. The SMP changed the monitoring frequency from semiannually to annually.

[1] The SMP provides for the proper management of all post-construction remedy components. Specifically, the SMP describes procedures to confirm that the requisite engineering and institutional controls are in place and that nothing has occurred that will impair the ability of said controls to protect public health or the environment. The SMP also includes an inventory of use restrictions; the necessary provisions related

Air quality monitoring is conducted at the perimeter of the landfill on a quarterly basis in conjunction with site inspections.

Potential site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

## III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are summarized in Table 2, below.

**Table 2: Protectiveness Determinations/Statements from the 2016 FYR**

| OU # | Protectiveness Determination | Protectiveness Statement |
|---|---|---|
| 01 | Protective | The OU1 remedy protects human health and the environment. |
| Sitewide | Protective | The sitewide remedy protects human health and the environment. |

The previous FYR had no recommendations. It did, however, identify several observations and offered suggestions to resolve the issues; Table 3 summarizes how the issues were addressed.

**Table 3: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls**

| Comment | Suggestion | Status |
|---|---|---|
| While groundwater and surface water samples are reportedly analyzed for baseline and routine parameters, not all parameters are being reported in the monitoring reports. | Future monitoring reports should include analysis and reporting for all parameters. | Annual monitoring reports now include full analytical lists per media. |
| Current monitoring reports do not include air quality data. | Air quality monitoring results should be reported as a supplement to the groundwater monitoring report. | Air monitoring logs are incorporated into the Annual Reports appendix with a brief discussion of the results. |

## IV. FIVE-YEAR REVIEW PROCESS

### Community Notification, Involvement & Site Interviews

On September 22, 2020, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the Johnstown City Landfill site. The announcement can be

to the implementation of the requirements of the DCR&EE, a provision for the performance of the operation, maintenance and monitoring required by the remedy; and a provision that the County submit periodic certifications that the institutional and engineering controls are in place.

found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews. In addition to this notification, a notice of the commencement of the FYR was posted on EPA Region 2's site webpage and sent to local public officials. The notice was provided to the town of Johnstown on September 15, 2020, with a request that the notice be posted in the town hall and on the town webpage. The purpose of the public notice was to inform the community that EPA would be conducting a FYR to ensure that remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included contact information, including addresses and telephone numbers, for questions related to the FYR process or the site.

Once the FYR is completed, the FYR report will be made available online (http://www.epa.gov/superfund/johnstown-city-landfill) and at the site information repositories. The information repositories are maintained at the EPA Region 2 Superfund Records Center, 290 Broadway, 18th Floor, New York, New York and the Johnstown Public Library, 38 South Market Street, Johnstown, New York.

## Data Review

The FYR evaluates data collected from 2016 through 2019.

*Groundwater*

Fourteen monitoring wells surrounding the former landfill are sampled as a part of the annual groundwater sampling program. Monitoring wells screened in the overburden upper water-bearing unit include MW-2S, 3S, 6S, 7S, 9S, and 15S. Monitoring wells screened in the overburden intermediate water-bearing unit include MW-2M, 3M, 6M, 9D, and 15D. Monitoring wells screened in the bedrock water-bearing unit include MW-2D, 3D, and 7D. See Appendix A, Figure 2, for the location of the monitoring wells. Groundwater is sampled for VOCs, metals, and leachate indicator parameters. Appendix A, Figure 3, shows shallow overburden groundwater contours with groundwater flowing from monitoring well MW-7 south-southeast toward monitoring well MW-15.

*Volatile Organic Compounds*

In 2016 and 2018, VOCs were not detected at concentrations exceeding their NYSDEC Class GA Groundwater Standards (GA Standards) of in any of the monitoring wells that were sampled. In 2017 and 2019, however, benzene was detected at a concentration greater than its GA Standard of 1 microgram per liter (µg/L) in monitoring well MW-3 (1.1 µg/L and 1.2 µg/L, respectively).

*Metals*

During the review period, the following metals were detected at concentrations greater than the respective Class GA Standards in the majority of monitoring wells:

- Iron concentrations greater than the Class GA Standard (300 µg/L) ranged from 590 to 36,400 µg/L. There were slight increase in upgradient monitoring well MW-6, but the concentrations remain well below historical maximum concentrations.

- Manganese concentrations greater than the Class GA Standard (300 µg/L) ranged from 304 to 3,849 µg/L. The highest concentration was detected from a sample collected from an upgradient well.
- Sodium concentrations greater than the Class GA Standard (20,000 µg/L) ranged from 20,500 to 77,700 µg/L in upgradient monitoring well MW-6. There were slight increases in monitoring wells MW-2S/D, 3M/3D, 9D, and 15S/D, but concentrations remain well below historical maximum concentrations.
- Barium (1,064 µg/L, monitoring well MW-7D, 2016), lead (135 and 122.7 µg/L, monitoring well MW-3S, 2016 and 2017, respectively), selenium (17 µg/L, monitoring well MW-9, 2016), and dissolved antimony (4.89 µg/L, monitoring well MW-2S, 2017) had isolated detections at various monitoring wells during different sampling events that exceeded the respective Class GA Standard.

These results are consistent with previous review periods.

Although elevated lead concentrations in samples from monitoring well MW-3 have been noted in past reviews, since 2018, the lead concentration has been either non-detect or below the GA Standard.

*1,4-Dioxane and Polyfluoroalkyl Substances*

At the request of NYSDEC, groundwater samples from eight monitoring wells at the site were analyzed for 1,4-dioxane and polyfluoroalkyl substances (PFAS). The NYSDEC emerging contaminant screening level for 1,4-dioxane in groundwater is 0.35 µg/L; New York State recently enacted a drinking water standard Maximum Contaminant Level (MCL) of 1 µg/L for 1,4-dioxane. 1,4-dioxane was only detected in monitoring well MW-2S, screened in the upper overburden unit downgradient of the landfill, at a concentration 0.209 µg/L. This is below the NYSDEC screening level and MCL.

Groundwater samples were collected for PFAS analysis from eight monitoring wells. The EPA Health Advisory (HA) level is 0.070 µg/L for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), individually and combined. The screening value defined in the December 19, 2019 "Interim Recommendations to Address Groundwater Contaminated with Perfluorooctanoic Acid and Perfluorooctanesulfonate (OLEM Directive No 9283.1-47)," is 0.040 µg/L. The New York State MCL for PFAS and PFOA is 0.010 µg/L individually. Individual PFOA and PFOS results were below the MCL for all samples and combined results were below the HA for all samples.

*Leachate Indicator Parameters*

Leachate indicator parameter results were generally consistent with analytical results between the sampling events for the review period. The key leachate indicators presented graphically in Appendix A, Figures 4-7, include ammonia nitrogen,[2] chloride, manganese, iron, and sodium.

[2] Nitrogen is present in the landfill refuse as a component of organic matter. Upon decomposition of the organic matter, nitrogen is converted to ammonia under anaerobic (low oxygen) conditions. Because

Concentrations are low relative to historical results and the results generally show decreasing to stable trends indicating that ongoing impacts to groundwater from the landfill are not occurring. Several parameters exhibited slight increases in concentrations during the review period as follows.

There were slight increases of chloride in monitoring wells MW-2S/M/D and 15S, but the results remain below the GA Standard.

There were slight increases of ammonia nitrogen in monitoring wells MW-2S, 3S, and 9S/D, but the concentrations remain well below historical maximum concentrations. The ammonia nitrogen results have historically fluctuated marginally above and below the GA Standard at monitoring wells located throughout the site. Ammonia nitrogen was the only leachate indicator parameter where groundwater concentrations exceeded its GA Standard of 2 milligrams per liter (mg/L) during the review period. During the review period, in groundwater sampled from nine monitoring wells, concentrations greater than the Class GA Standard ranged from 2.13 to 11.6 mg/L. Ammonia nitrogen concentration trends should continue to be monitored during future sampling events.

*Surface Water*

During the review period, surface water samples were collected in June 2016, June 2017, June 2018 and May 2019 from the three designated surface water sampling locations in Mathew Creek, as shown on see Appendix A, Figure 8 (SW-1, SW-2 [background sampling location], and SW-3, with a blind duplicate collected from SW-3 [DUP-1]). The samples were analyzed for Part 360 baseline parameters, including dissolved metals. The results are discussed below.

*Volatile Organic Compounds*

No VOC standards were exceeded in the surface water samples collected during the review period.

*Metals*

During the review period, antimony and manganese were the only metals that exceeded surface water standards. At background sample location SW-2, antimony was detected at 5.9 µg/L (the standard is 3 µg/L) in 2017. At sample location SW-1, manganese was detected at 329.5 µg/L (the standard is 300 µg/L) in 2018. Manganese concentrations greater than the surface water standard were detected in location SW-1 ranging from 329.5 to 6,046 µg/L and at location SW-3 in only one sample collected in June 2018 484.5 µg/L.

Iron concentrations in all the monitoring wells were greater than the surface water standard,

anaerobic conditions prevail in landfills, ammonia nitrogen is the major nitrogen species in leachate. Elevated ammonia nitrogen concentrations in monitoring wells can be an indication that the landfill leachate is impacting nearby groundwater.

ranging from 319 to 6,860 µg/L.

During the review period, there were isolated detections above surface water standards for aluminum (372 µg/L at SW-1[3] in June 2018, 190 µg/L at SW-1 in May 2019, 141 µg/L at SW-2 in June 2016 1,630 µg/L at SW-2 in June 2017, 1,090 µg/L at SW-2 in December 2017, 199 µg/L at SW-2 in June 2018, 375 µg/L at SW-3 in June 2016, 141 µg/L at SW-3 in December 2017), cobalt (11.74 µg/L at SW-1 in June 2018), and silver (0.2 µg/L at SW-3 in June 2016). The sample results were inconsistent, did not show increasing trends, and surface water standard exceedances were in total metals results, but not dissolved metals results.

All other metals concentrations have been either non-detect or detected at concentrations less than the applicable surface water standards, typically at concentrations less than the total (unfiltered) metal results.

*Sediment*

Sediment sample locations SED-1 through SED-9 were sampled annually for Target Analyte List metals and Total Organic Carbon during the review period (see Appendix A, Figure 8). In general, the analytical results remain within the historical range and the elevated concentrations have been sporadic and isolated. NYSDEC has three categories for classifying sediments--Class A is defined as the contaminant can be considered to present little or no potential for risk to aquatic life; Class B is defined as additional information is needed to determine the potential risk to aquatic life and the potential for risk to aquatic life cannot be ascertained from contaminant concentration data alone; and Class C is defined as having a high potential for the sediments to be toxic to aquatic life.

During the review period, arsenic, cadmium, nickel, and silver were each detected in one or more sediment sampling locations at concentrations greater than their respective NYSDEC Sediment Guidance Value (SGV) for Freshwater Class A sediment screening criteria of less than 10 milligrams per kilogram (mg/kg), 1 mg/kg, 23 mg/kg, and 1 mg/kg, respectively, with several exceeding Class B SGVs (10-33 mg/kg, 1-5 mg/kg, 23-49 mg/kg, and 1-2.2 mg/kg, respectively) and Class C SGVs (greater than 33 mg/kg, 5 mg/kg, 49 mg/kg, and 2.2 mg/kg, respectively).[4] Specifically, nickel exceeded the Class C SGV criteria in the 2016, 2017, and 2018 sampling rounds with concentrations ranging from 84 to 250 mg/kg and silver exceeded the Class C SGV in 2017 at 26 mg/kg and in 2018 at 2.94 mg/kg. The sediment results from 2019 indicated that no concentrations were greater than the Class C SGVs. Several compounds exceeded Class B SGV during the review period, with arsenic results being greater than the Class B SGV of 10 mg/kg, but less than the Class C SGV of 33 mg/kg in five sediment samples, with concentrations ranging from 10.5 mg/kg in 2018 to 26.6 mg/kg in 2019. In 2019, cadmium was detected above the Class B SGV of 1 mg/kg, but less than the Class C SGV of 5 mg/kg in 10 sediment samples, ranging from 1.18 mg/kg to 2.07 mg/kg. Nickel detections ranged from 1.83 mg/kg (2018) to 250 mg/kg (2017) during the review period.

[3] "SW" followed by a number denotes a surface water sample location.
[4] Compounds that exceed Class B and/or Class C SGVs also exceed the Class A SGVs.

A result that falls within the Class B SGV indicates that further investigation of the concentration should be completed to evaluate if the concentration falls further in line with Class A SVG or Class C SVG. Continued sampling of sediments should be performed and the results and trends evaluated in the next FYR.

**Site Inspection**

A FYR inspection of the site was conducted on September 17, 2020. In attendance were George Jacob and Urszula Kinahan from EPA, Nicole Hinze from NYSDEC, Christopher Vose and Joel Wilson from Johnstown City, and Mark Flusche from Arcadis. The purpose of the inspection was to assess the protectiveness of the remedy.

No issues were observed during the inspection, impacting current and/or future protectiveness. The cap and vegetative cover are intact and in good condition; the fence around the cap within the site is intact and in good repair; the monitoring wells are functional; and there is no evidence of erosion, trespassing, or vandalism.

## V. TECHNICAL ASSESSMENT

***QUESTION A: Is the remedy functioning as intended by the decision documents?***

The major components of the selected remedy include the excavation of the LaGrange Gravel Pit sediments and placement of the excavated materials onto the existing landfill and the construction of a multilayer closure cap over the landfill mound and excavated sediments as per New York State 6 NYCRR Part 360 regulations.

All remedial actions were completed in 1997 and the site is currently being monitored. A revised SMP was approved by NYSDEC in April 2016.

The selected remedy is functioning as intended by the decision documents. At the present time, landfill cover system is working properly and is not subject to erosion or damage. The cap, by reducing leachate generation, acts to improve the groundwater quality in the upper (overburden) and lower (bedrock) aquifers and surface-water quality in Mathew Creek through natural attenuation of contaminants.

During the review period, benzene in monitoring well MW-3S was the only VOC detected. Its concentrations fluctuated slightly above and below the GA Standard of 1 µg/L.

During each annual sampling event during the review period, at least one metal (total iron, manganese, lead, and/or sodium) was detected at a concentration greater than the corresponding GA Standard in each of the 14 monitoring wells. There is uncertainty as to whether the data is sufficient to conclude that sustained elevated iron, manganese, and sodium in groundwater are due to influence from the landfill. There appear to be elevated metals and ammonia nitrogen in monitoring wells downgradient of the landfill compared to the monitoring well MW-7 cluster

upgradient of the landfill, indicating that the landfill may be influencing nearby groundwater conditions. However, the other upgradient well cluster, monitoring well MW-6, shows elevated metals and ammonia nitrogen. These elevated concentrations could indicate that groundwater in the monitoring well MW-6 cluster is influenced by radial or side-gradient flow from the landfill or there is possibly an upgradient source, such as naturally-occurring minerals in the bedrock. The Canajoharie Shale is the bedrock underlying this area and the natural occurrence of iron and manganese as a mineralogical component of the rock and resulting weathered soils may also contribute to at least a portion of the detections observed in groundwater samples. Continued monitoring will help determine if there are increasing trends in site contaminants of concern or leachate indicator parameters that would indicate a continuing source of contamination from the landfill to groundwater.

Surface water and sediment data indicate that there are still exceedances of standards and criteria, respectively. However, evaluation of exceedances over the reporting period do not show a clear trend between upstream and downstream sampling locations. Sediment and surface water sampling should continue and be evaluated for trends.

Sampling for emerging contaminants in groundwater (1,4-dioxane and PFAS) was conducted at the landfill in 2018. 1,4-dioxane was only detected in monitoring well MW-2S, screened in the upper overburden unit downgradient of the landfill, at 0.209 µg/L, which is below the NYS MCL of 1 µg/L. Individual PFOA and PFOS results were below the State MCL of 0.010 µg/L for all samples and combined results were below the 0.070 µg/L HA for all samples.

Currently, any constituents present in the downgradient groundwater do not impact residents because the municipal water supply line was extended to all of the potentially impacted residences.

***QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?***

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. Land-use assumptions, exposure assumptions and clean up levels considered in the decision document followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid.

The results of the baseline human health risk assessment concluded that the estimate cancer risk ($2 \times 10^{-4}$) and noncancer hazard (6.5) for the hypothetical resident ingesting contaminated groundwater from beneath the site exceeded EPA's threshold criteria.

As part of the selected remedy, a multilayer closure cap was placed over the landfill, a chain link fence surrounding the entire landfill was erected and appropriate warning signs were posted. These measures have effectively minimized the potential for direct contact to contaminated soil and landfill material by all nearby receptors. In addition, the ROD remedy required the expansion of the Johnstown City water supply to provide potable water to all private water supplies along with the imposition of property deed restrictions to prevent future installation of drinking water wells

at the site. These measures, along with post-construction monitoring of groundwater, ensure that nearby residents/receptors are not impacted by landfill contaminants present in groundwater.

Although the exposure assumptions and toxicity assessment conducted to support the 1993 Ecological Risk Assessment may not necessarily reflect the current methodology, the remedy is protective of ecological resources as contaminated sediments and soil were dredged/excavated and contained within a secure covered landfill. Given that the source of the contaminants have been controlled through the remedial actions, which eliminates the exposure pathways for ecological receptors on the site, the conclusions from the previous FYR that the site is protective of ecological receptors remains valid.

The RAOs for the Site remain valid.

Soil vapor intrusion (VI) is evaluated when soils and/or groundwater are known or suspected to contain VOCs. During the last five years of groundwater monitoring there were no exceedances of VOCs above EPA's groundwater based VI screening levels in any of the site monitoring wells. Further, there are currently no buildings overlying the affected plume area; therefore, the vapor intrusion pathway remains incomplete and a vapor intrusion investigation is not necessary at this time.

***QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?***

No

## VI. ISSUES/RECOMMENDATIONS

There are no recommendations or follow-up actions for this FYR.

## OTHER FINDINGS

Continued sampling of sediments and surface water should be performed and the results and trends evaluated in the next FYR.

## VII. PROTECTIVENESS STATEMENT

Table 5, below, presents the operable unit and sitewide protectiveness statements.

**Table 5: Protectiveness Statements**

| Protectiveness Statement(s) | | |
|---|---|---|
| *Operable Unit:*<br>OU1 | *Protectiveness Determination:*<br>Protective | *Planned Addendum Completion Date:* |

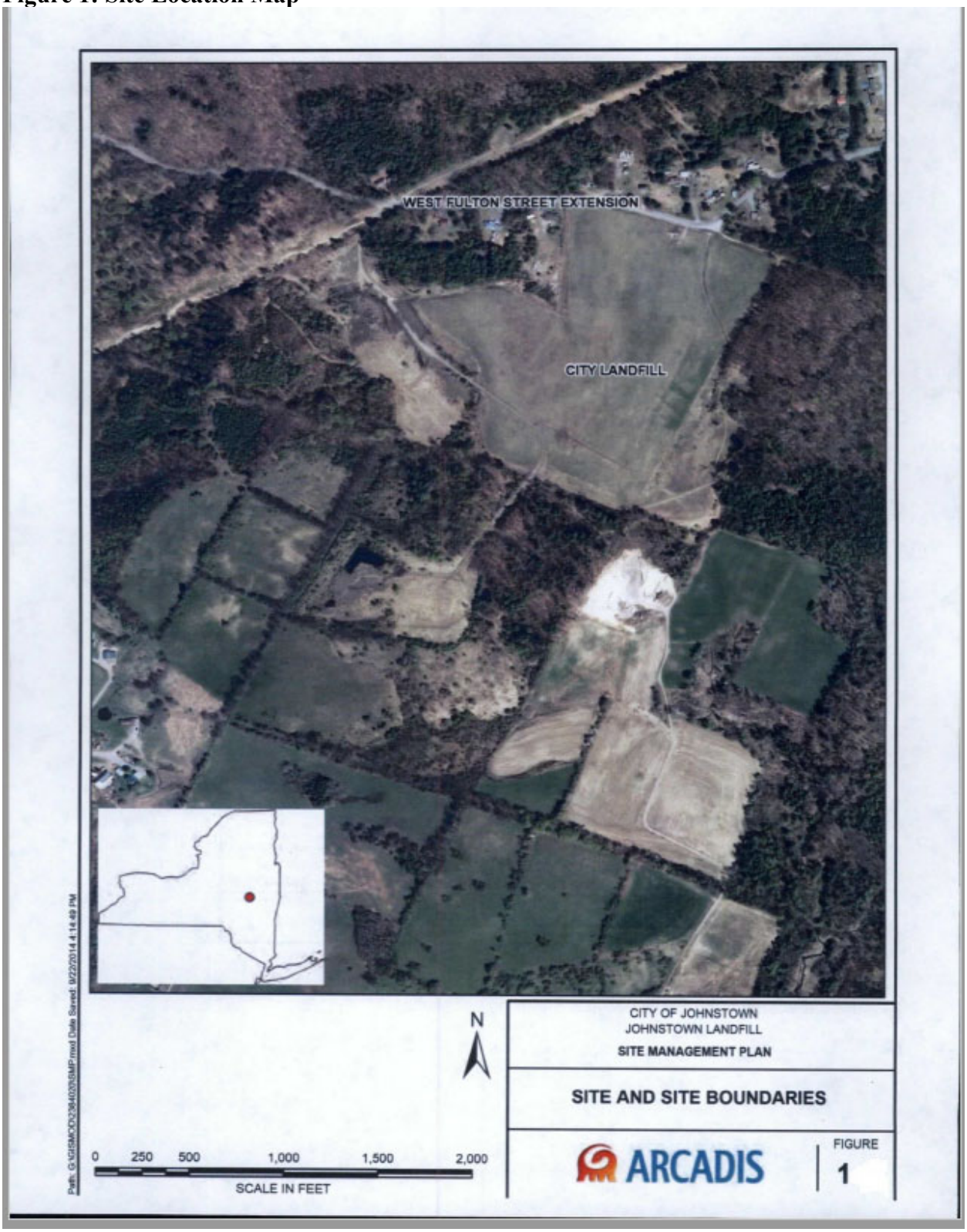
| | |
|---|---|
| | Click here to enter a date |
| *Protectiveness Statement:* The OU1 remedy protects human health and the environment. | |
| **Sitewide Protectiveness Statement** | |
| *Protectiveness Determination:* Protective | *Planned Addendum Completion Date:* Click here to enter a date |
| *Protectiveness Statement:* The sitewide remedy protects human health and the environment. | |

## VIII. NEXT REVIEW

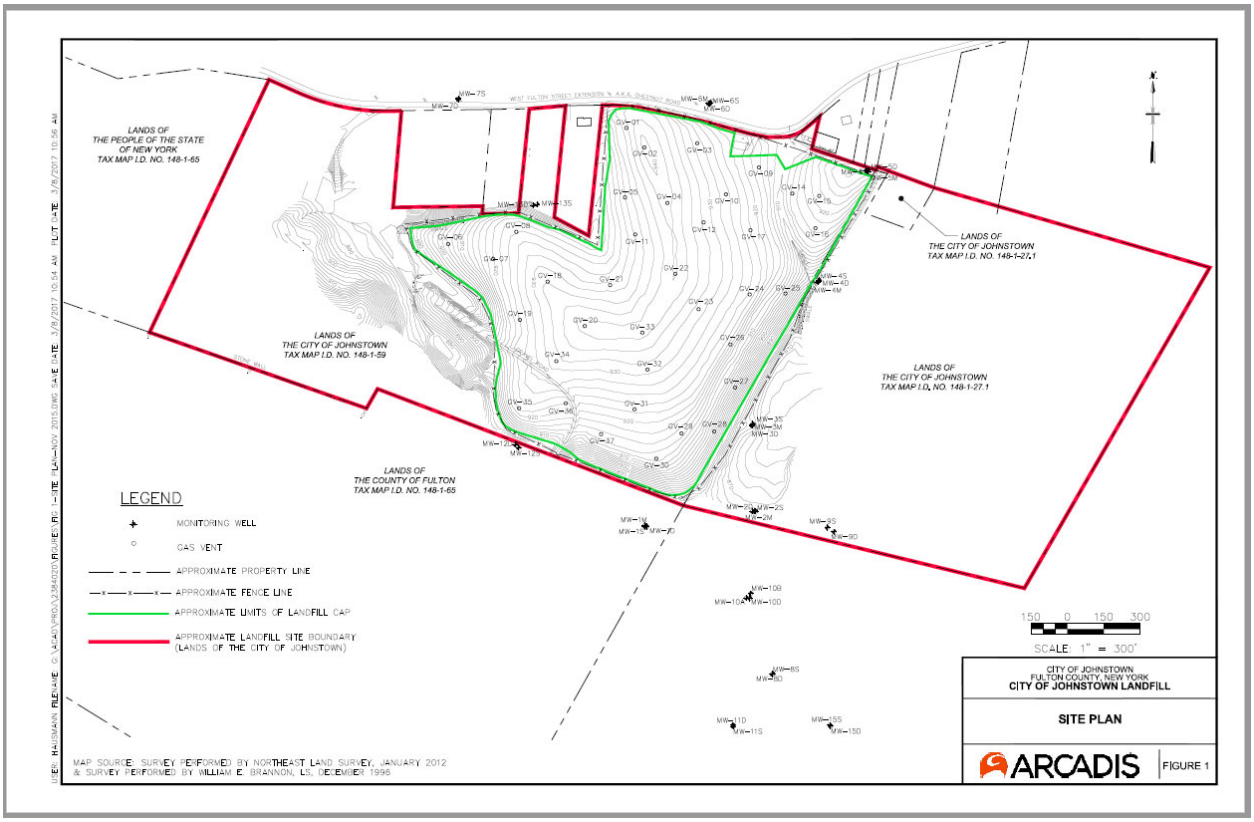
The next FYR report for the Johnstown Landfill Superfund site is required five years from the completion date of this review.

# APPENDIX A – FIGURES

**Figure 1: Site Location Map**



## Figure 2: Site Boundary



## Figure 3: Contour Map

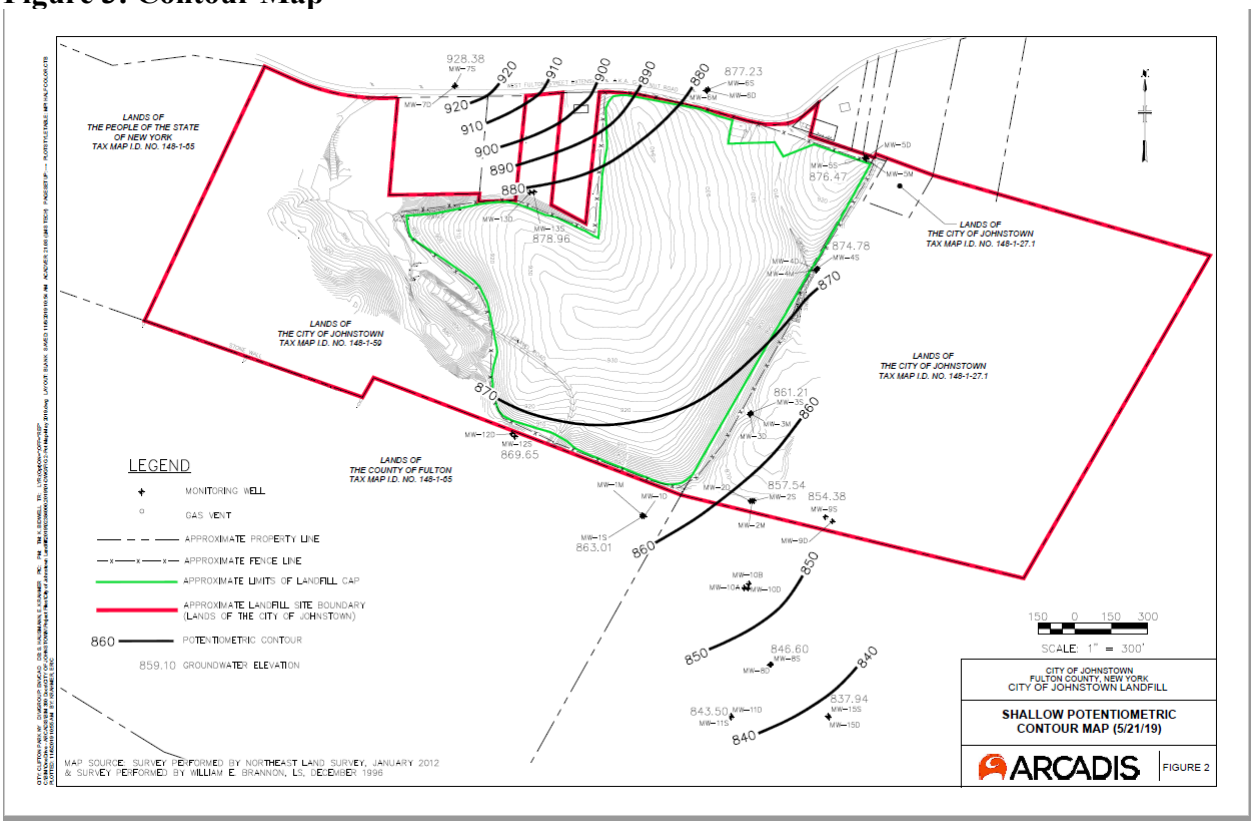


**Figure 4: Trend Charts for Monitoring Well MW-6 Well Cluster**

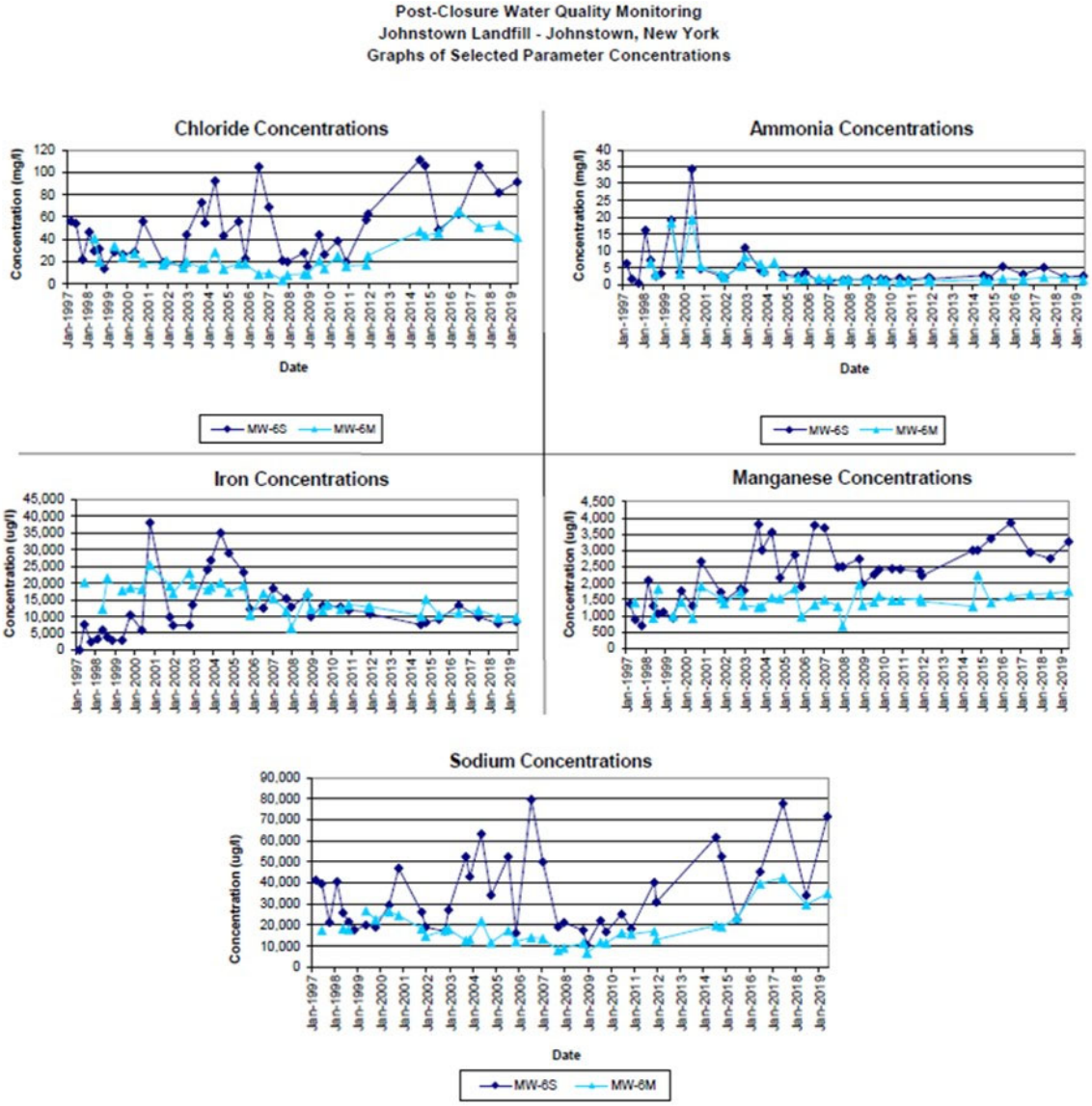


**Figure 5: Trend Charts for Monitoring Well MW-7 Well Cluster**

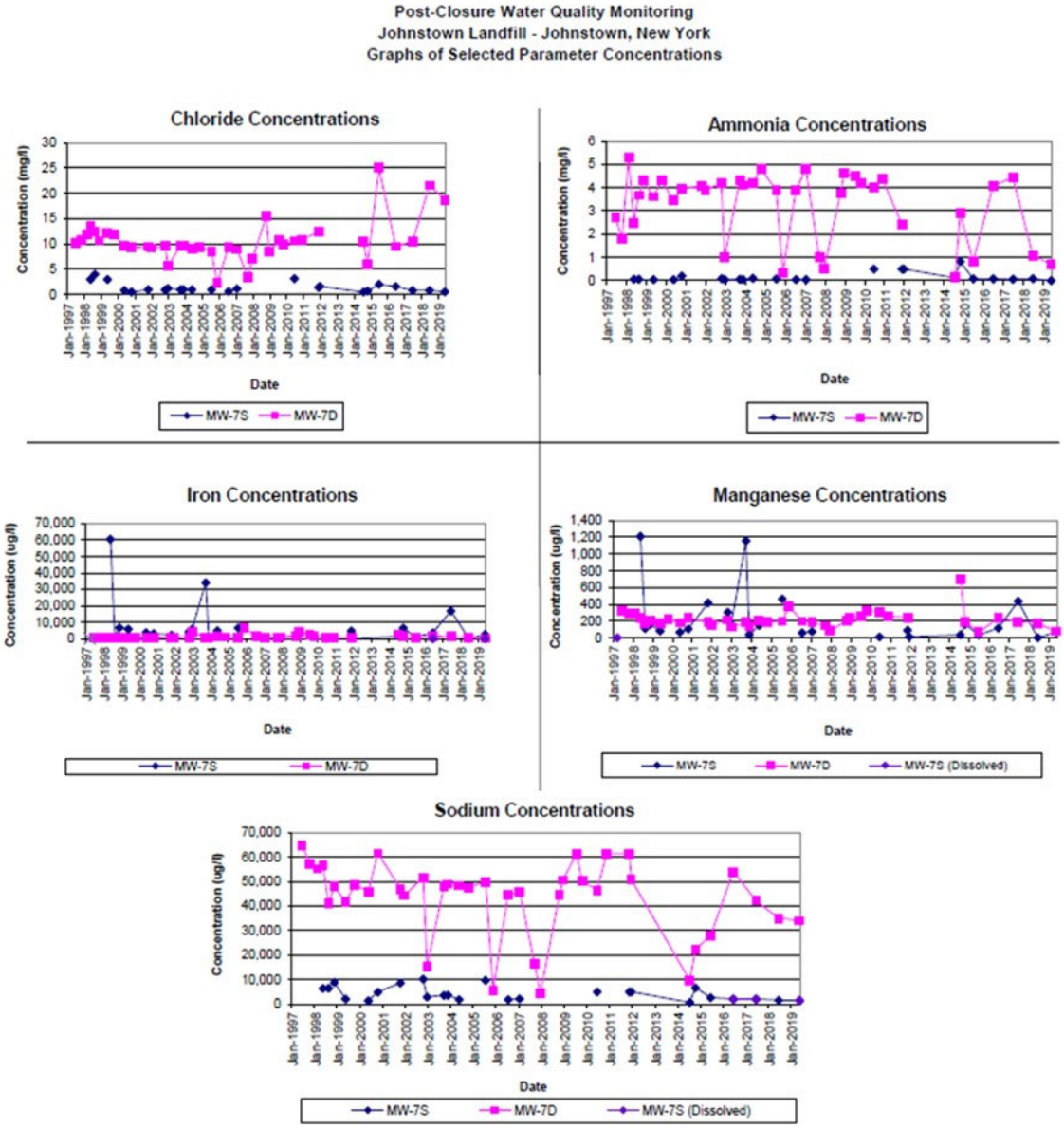


**Figure 6: Trend Charts for Monitoring Well MW-2 Well Cluster**

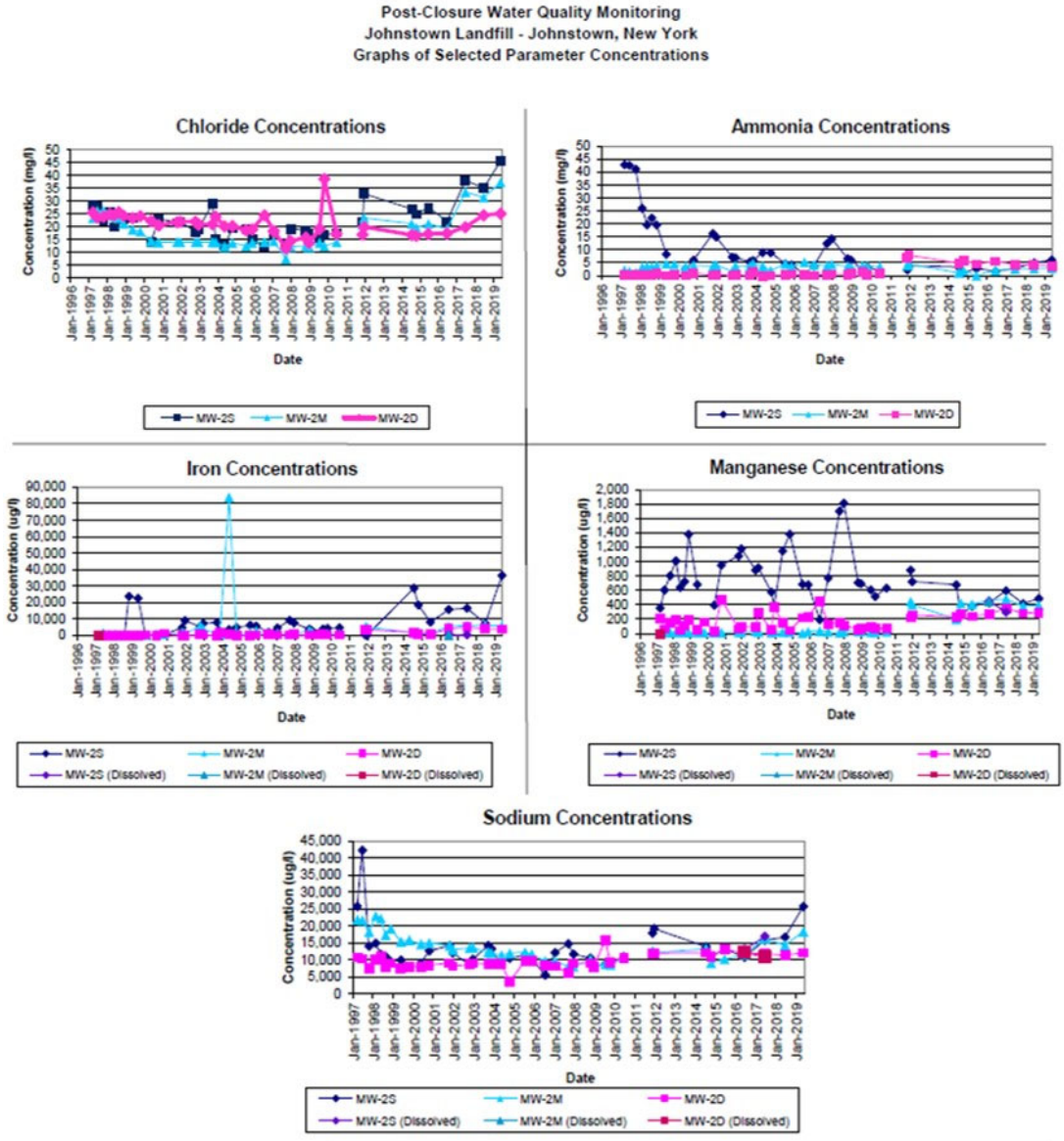


**Figure 7: Trend Charts for Monitoring Well MW-3 Well Cluster**

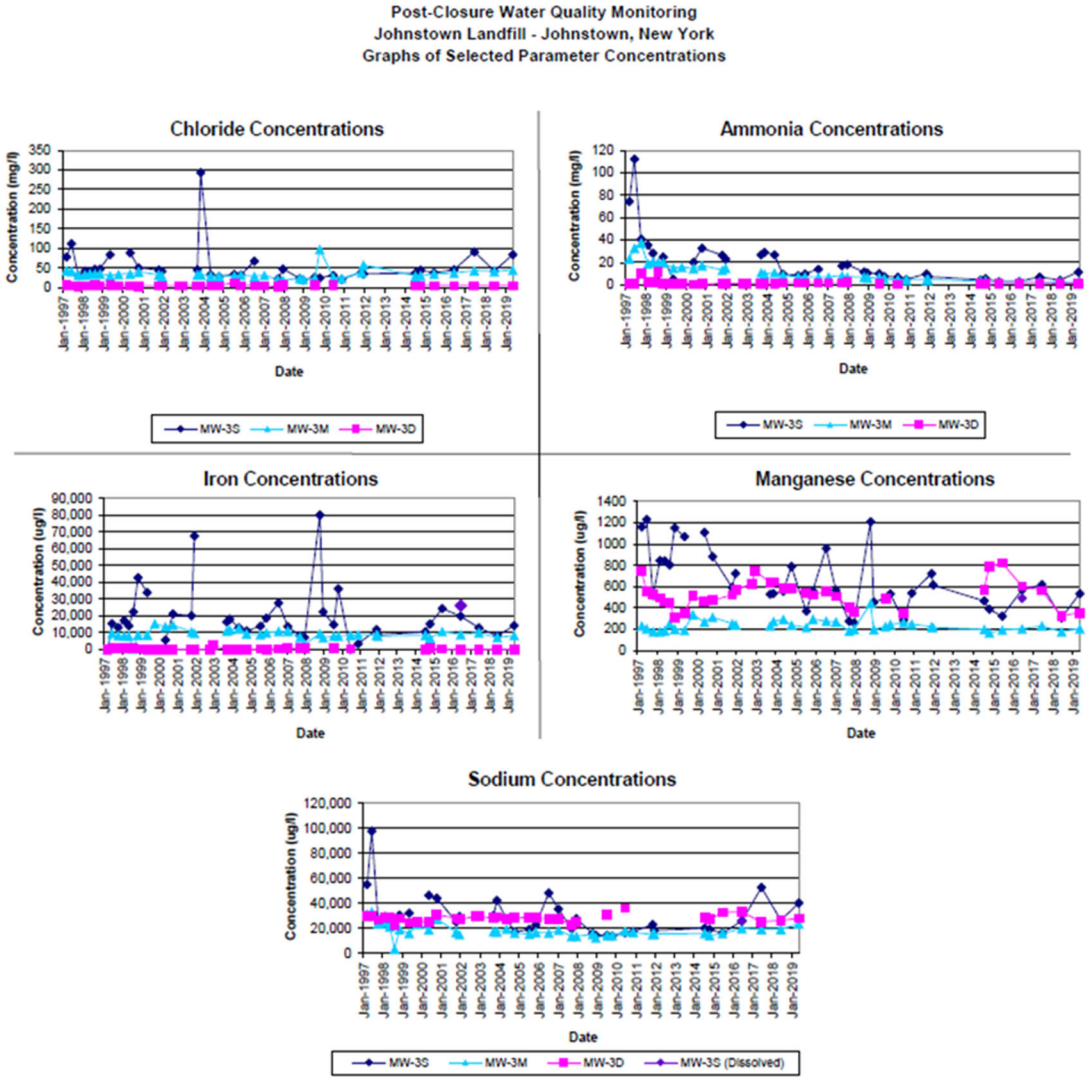
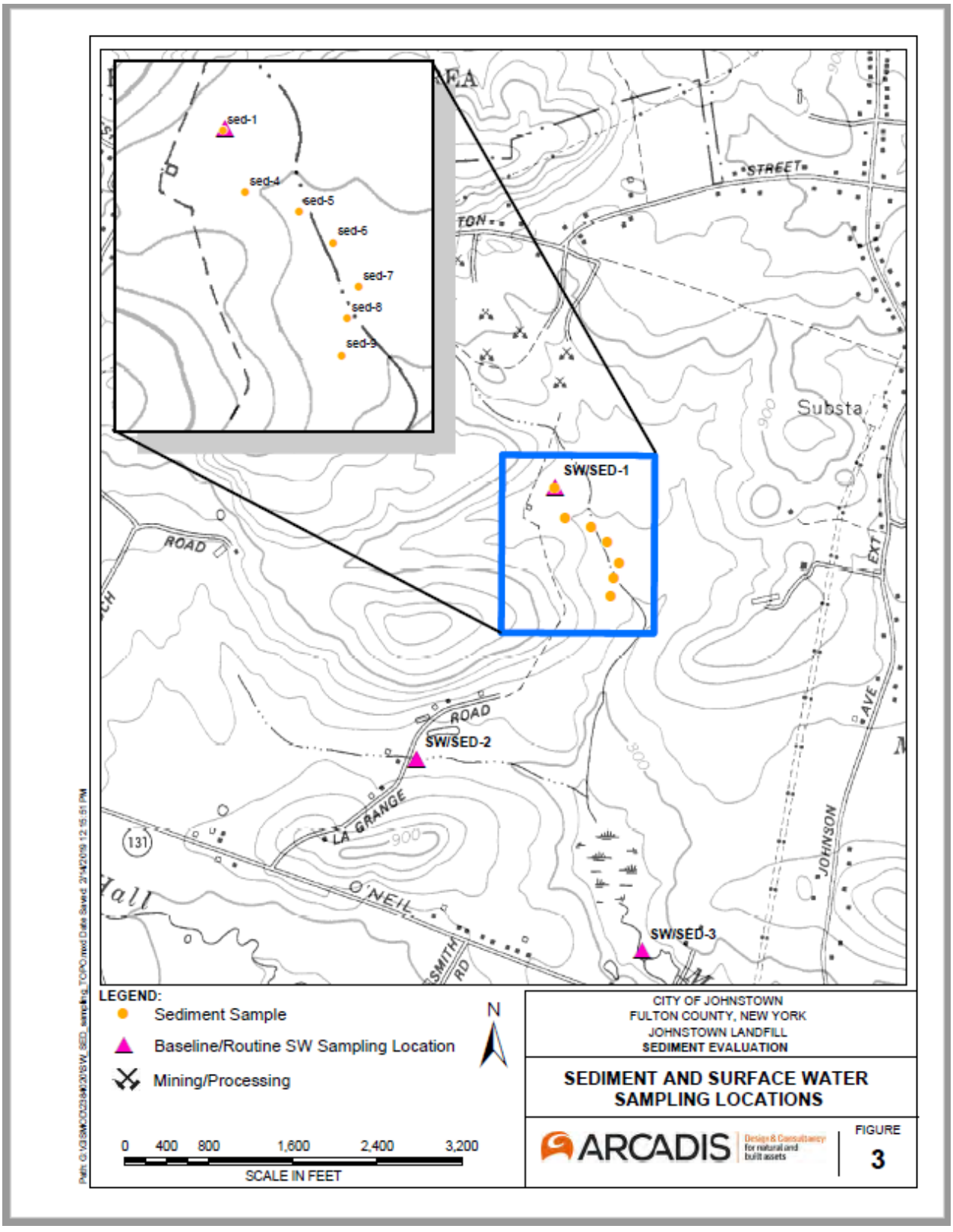


**Figure 8: Sediment and Surface water sampling locations**



# APPENDIX B – DOCUMENTS, DATA, AND INFORMATION REVIEWED IN COMPLETING FIVE YEAR REVIEW

| Documents, Data, and Information Reviewed in Completing Five-Year Review | |
|---|---|
| **Document Title, Author** | **Submittal Date** |
| Remedial Investigation/Feasibility Study, Thermo Consulting Engineers | 1993 |
| Record of Decision, EPA | 1993 |
| Final Design Report, Johnstown City Landfill Closure, City of Johnstown, New York, Malcolm Pirnie | 1995 |
| Operation and Maintenance Monitoring Manual, Arcadis | 1996 |
| Preliminary Close-Out Report, EPA | 1997 |
| First Five-Year Review Report, EPA | 2000 |
| Second Five-Year Review Report, EPA | 2005 |
| Third Five-Year Review Report, EPA | 2010 |
| Third Five-Year Review Report-Addendum, EPA | 2014 |
| Quality Assurance Project Plan, Arcadis | 2015 |
| Site Management Plan, Arcadis | 2015 |
| Fourth Five-Year Review Report, EPA | 2016 |
| Declaration of Restrictive Covenants, Restrictions and Environmental Easements, Access Agreement, Environmental Notice, EPA/NYSDEC | 2016 |
| Annual Reports | 2016-2019 |

# APPENDIX C: SITE TOPOGRAPHY, GEOLOGY, AND HYDROGEOLOGY

**Site Geology/Hydrogeology**

The 34-acre landfill consists of two, generally flat terraces. A remnant of a pit once used as a demolition debris and metals disposal area, approximately 30 feet deep, exists on the westward side of the landfill at the base of a steep ridge. The area surrounding the site consists of low density residential areas to the north, and mixed wooded and agricultural lands to the east, south and west. The landfill is located in a former gravel borrow pit.

Surface-water drainage in the vicinity of the landfill flows generally to the southeast. Surface waters flow from the upland areas, north of the site, via intermittent drainage ways toward the south-southeast. The primary surface-water feature in the immediate vicinity of the landfill is Mathew Creek. The headwaters of Mathew Creek (LaGrange Springs) are located approximately 1,000 feet southeast of the site. Mathew Creek flows southeasterly until it converges with Hall Creek prior to discharging into Cayadutta Creek. The flow of Mathew Creek is interrupted by a man-made pond (Hulbert's Pond) before it converges with Hall Creek. Cayadutta Creek ultimately discharges to the Mohawk River.

LaGrange Gravel Pit, located approximately 100 feet east of the eastern margin of the landfill, receives surface runoff from hill slopes in its immediate vicinity and occasional ephemeral runoff from the landfill surface. Except for the short-lived drainage flow to LaGrange Gravel Pit, there is no surface water runoff from the landfill. There is no surface water runoff from LaGrange Gravel Pit.

Wetlands are associated with LaGrange Springs and Mathew Creek.

Two aquifers exist beneath the Johnstown City Landfill. The upper (overburden) aquifer flows through till, sand and gravel, and flows generally toward the south and southeast from the landfill following surface drainage patterns. Groundwater in the overburden and shallow bedrock aquifers appears to be hydraulically connected downgradient from the site and to discharge into the wetlands area of LaGrange Springs and Mathew Creek located southeast of the site. In contrast to the groundwater flow pattern in the shallow water table, deep (bedrock) groundwater generally flows from west to east across the site.

The immediate area of the landfill is underlain by the Canajoharie Shale, a mid-Ordovician age, calcareous shale with occasional pyrite lobes. The bedrock was found to be mildly fractured in the upper 20 feet of the unit. Depth to bedrock ranges across the site from about 30 feet to 120 feet.